Econ435 – Financial Markets and the Macroeconomy
Problem Set 3

Due: Wednesday, August 15

Question 1

Investor X and investor Y both have utility functions of the form $U = E(r) - 0.005A\sigma^2$. They are both considering investments in stock A, which has an expected return of $E(r_A) = 10\%$ and risk given by $\sigma_A = 17\%$. Investor X has a coefficient of risk aversion $A = 5$ and investor Y's certainty equivalent for stock A is $ce = 4.22\%$.

(i) Calculate investor X's certainty equivalent of stock A. Is she more or less risk averse than investor Y?

(ii) What is investor Y's coefficient of risk aversion? Does your answer confirm or reject your previous statement about the aversion toward risk of investor X relative to investor Y?

(iii) *(extra credit)* Stock B has an expected return $E(r_B) = 8\%$ and risk given by $\sigma_B = 12\%$. What are the certainity equivalents for the two investors? Would any of them want to invest in it if the risk-free asset offered a return $r_f = 5\%$? (Ignore stock A in this part.)

Question 2

The return on stock A has a correlation with the return on the market portfolio equal to $Cov(r_A, r_m) = 243$. Stock B's expected return is $E(r_B) = 10.6\%$. The market portfolio has an expected return $E(r_m) = 12\%$ and a standard deviation $\sigma_m = 15\%$. The return from holding the risk-free asset is 5%.

(i) What is the beta coefficient for stock A? What is the expected return for stock A, as predicted by the CAPM?

(ii) What is the beta coefficient for stock B? Is it more risky or less risky than stock A?

(iii) Portfolio P is constructed by combining stocks A and B, with weights $w_A = 0.4$ and $w_B = 0.6$. What is the beta coefficient of this portfolio? What should be the expected return on this portfolio?

(iv) Portfolio Q puts weights $w_A = 0.8$ and $w_B = 0.2$ on the two stocks. What are the beta coefficient and the expected return of this portfolio?

(v) Draw the Security Market Line and plot the four assets (stocks A and B and portfolios P and Q) on the graph.

(vi) You believe the rates of return of stocks A and B to be $E^a(r_A) = 15\%$ and $E^a(r_B) = 11\%$, respectively. What are the alpha coefficients of the two stocks? Are they under- or over-priced? In which stock(s) would you want to invest?

(vii) *(extra credit)* An announcement is being made that company A will split its stock 2-for-1. Explain how would the expected return of stock A change according to the CAPM model.

Question 3

Stock A has an expected return of $E(r_A) = 8\%$ and stock B has a beta coefficient of $\beta_B = 1.5$. The expected return on the market portfolio is $E(r_m) = 10\%$. There is no risk-free asset, but we can construct a zero-beta portfolio with an expected return $E(r_{zm}) = 4\%$.

(i) What is the expected return of stock B?

(ii) What is the beta coefficient of stock A?

(iii) *(extra credit)* If stock B were very illiquid and investors would require a liquidity premium $f(c_B) = 2\%$, how much would its expected return be?

Question 4

Explain, intuitively, why the variance or standard deviation are the right measure of risk when analyzing well diversified portfolios but not when looking at other assets, and why beta is the right measure of risk for any asset. (Hint: think about the sources of risk that the market would reward investors for taking on.)